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# TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	09/743,634
Filing Date	March 16, 2001
Inventor(s)	Hans-Peter BURVENICH et al.
Group Art Unit	2125
Examiner Name	Michael D. Masinick
Attorney Docket Number	32860-000115/US

## ENCLOSURES (check all that apply)

☐ Fee Transmittal Form

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☐ Amendment

☐ After Final

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☐ Response to Missing Parts/  
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1.52 or 1.53

☐ Assignment Papers  
(for an Application)

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☐ Petition to Convert to a  
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Group

☐ LETTER SUBMITTING APPEAL  
BRIEF AND APPEAL BRIEF (w/clean  
version of pending claims)

☒ Appeal Communication to Group  
(Notice of Appeal, Brief, Reply Brief)

☐ Proprietary Information

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Remarks

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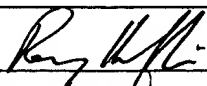
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Harness, Dickey & Pierce, P.L.C.

Attorney Name  
Ray Heflin

Reg. No.  
41,060

Signature



Date

November 3, 2004



**PATENT**

IN THE U.S. PATENT AND TRADEMARK OFFICE

Appellants: Hans-Peter BURVENICH et al.  
Application No.: 09/743,634  
Group Art Unit: 2125  
Filed: March 16, 2001  
Examiner: Michael D. Masinick  
For: CONTINUOUS CASTING INSTALLATION,  
ESPECIALLY A THIN SLAB CONTINUOUS  
CASTING INSTALLATION  
Attorney Docket No. 32860-000115/US

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**Mail Stop Appeal Brief - Patents**

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November 3, 2004

**REPLY BRIEF**

Sir:

This Reply Brief is responsive to the Examiner's Answer mailed September 3, 2004. Appellants have carefully reviewed the Examiner's Answer and respectfully request that the final rejection of claims 1, 2, 4 – 6, 8, 10, 11, 13, 15, 16, 18-23, and 26 be reversed in view of the following remarks.

**I. The Articulated Motivation is in Error:**

In the opening Brief, Appellants pointed out that the articulated motivation is in error. The Examiner counters with the same reasoning set forth in the final Office Action; i.e., that the alleged modification would have been obvious because genetic algorithms provide extraordinarily quick discovery of early approximate solutions.<sup>1</sup> Appellants still disagree.

The Examiner's position necessarily assumes that a genetic algorithm would obtain a solution quicker than the scheduling technique taught by Lee. If this were not the case, then the alleged modification would not appear to provide any advantage. Interestingly, however, the Examiner has not provided any objective evidence in terms of fact and/or technical reasoning as to how a genetic algorithm would outperform (or provide a solution more quickly than) Lee's scheduling technique. The Examiner cannot furnish such objective evidence because none exists. In this regard, the Examiner's position seems to be based in large part upon inappropriate speculation.

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<sup>1</sup> Examiner's Answer, numbered paragraph 19.

Furthermore, the Examiner has incorrectly paraphrased and/or simply misunderstood Appellants' argument. Namely, the Examiner indicates that Appellants assert the "current invention" is not concerned with the quick discovery of solutions, and characterizes this assertion as irrelevant to the validity of the alleged combination of references.<sup>2</sup>

However, Appellants previously argued that the ***primary reference to Lee*** is not at all concerned with generating a schedule quickly.<sup>3</sup> This is in fact relevant since the articulated motivation is that genetic algorithms provide extraordinarily quick discovery of early approximate solutions. In short, Lee is not concerned with generating a solution (or schedule) quickly, and therefore those skilled in the art would not have been motivated to make the alleged modification to provide quick solutions. The Examiner's assertions to the contrary are simply incorrect.

## **II. The Claimed Evaluating Feature:**

Appellants previously pointed out that none of the references applied by the Examiner (taken alone or in combination) teaches or suggests evaluating a solution from a genetic algorithm "by simulating the operation of the continuous casting a rolling plant," as required by

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<sup>2</sup> *Id.*

<sup>3</sup> Brief, paragraph bridging pages 5 and 6.

independent claims 1 and 20. The Examiner apparently recognizes as much, and therefore looks to an “outline” of a genetic algorithm supplied on page 7 of the Examiner’s Answer to allegedly make up for the deficiencies of the references.<sup>4</sup> In so doing, the Examiner compares the “Fitness” step of the outline to the claimed “evaluating” feature.<sup>5</sup> Appellants disagree.

As an initial matter, the Examiner should have at least indicated the source (or authority) for the outline appearing on page 7 of the Examiner’s Answer. Without this information, the outline amounts to nothing more than mere allegation, and therefore does not bolster the Examiner’s position. Notwithstanding, even if the outline were correct, the Examiner’s rejection position is tenable on by placing a strained interpretation on the outline.

Specifically, the outline shows that the Fitness step evaluates the fitness  $f(x)$  of each chromosome  $x$  in the population. According to the Examiner, the terms “evaluation” and “simulation” are one in the same in the context of genetic algorithms.<sup>6</sup> This is simply not understood because the two terms have practically and conceptually different

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<sup>4</sup> Examiner’s Answer, page 10, first full paragraph.

<sup>5</sup> *Id.*

<sup>6</sup> *Id.*

meanings. On the one hand, “evaluation” is to fix the value or worth of something.<sup>7</sup> On the other hand, “simulation” is to imitate something.<sup>8</sup> Clearly, the two terms are not synonymous, as alleged by the Examiner.

Furthermore, in the context of genetic algorithms, the Fitness step involves an “evaluation” in the plain sense of the word. Namely, as indicated in the Examiner’s outline, the fitness of the chromosomes is returned by a fitness function  $f(x)$ . As is well known in this art, the fitness function quantifies the optimality of a solution so that a particular chromosome may be ranked against all the other chromosomes. To this end, the fitness function returns an integer that represents a chromosome’s worth as a candidate solution.<sup>9</sup>

In contrast, a simulation involves imitating something. And in the specific context of claims 1 and 20, the method involves imitating the operation of the continuous casting and rolling plant; i.e., the events that would occur during an actual operation of the plant (based on the solution) are simulated.

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<sup>7</sup> THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE 453 (New College Edition 1979).

<sup>8</sup> *Id.* at 1207.

<sup>9</sup> Support can be found on the internet at <http://encyclopedia.thefreedictionary.com/Fitness%20function> and <http://jgap.sourceforge.net/javadoc/0.21/org/jgap/Configuration.html>.

The Examiner attempts to bolster his position by summarily concluding that “the only judgment to be made in a manufacturing environment, when looking for a way to evaluate these potential solutions, would be to approximate the outcome if that solution was actually used (simulate the result).”<sup>10</sup> This assertion is incorrect on its face. This is because the first step in a genetic algorithm is to translate the real problem into biological terms. This is why the potential solutions are referred to as chromosomes. Appellants acknowledge that genetic algorithms as a whole may simulate a genetic process (or evolution), but the individual steps within the genetic algorithm do not involve any simulation of real world problems.

The Examiner also reasons that “the only way to evaluate a continuous casting and rolling plant would be based upon the results of the continuous casting and rolling schedule.”<sup>11</sup> This assertion is not relevant because according to the claimed invention the solution (not the plant) is evaluated. Further, the continuous casting and rolling schedule in itself does not have results.

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<sup>10</sup> Examiner’s Answer, page 10, first full paragraph.

<sup>11</sup> *Id.*

In short, the fitness of a chromosome has nothing to do with simulating (or imitating) the operation of a continuous casting and rolling plant.

**III. Conclusion:**

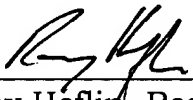
For the above reasons, as well as the reasons set forth in the opening Brief, Appellants respectfully requests that the Board reverse the Examiner's rejections of all claims on Appeal. An early and favorable decision on the merits of this Appeal is respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

HARNESS, DICKEY & PIERCE, P.L.C.

By

  
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